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Report

TO THE
HONORABLE BOARD OF DIRECTORS
OF THE
SANTA CLARA VALLEY
WATER CONSERVATION DISTRICT

on

Proposed Coyote Dam
No. 2

April 19, 1949

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REPORT ON PROPOSED COYOTE DAM NO. 2

Introduction

On March 8, 1949, the Board of Directors of the Santa Clara Valley Water Conservation District unanimously passed Resolution No. 244 authorizing an engineering investigation of the feasibility of constructing a second dam and reservoir on the Coyote River. In compliance with the instructions in this Resolution the following report is herewith submitted.

Description of Project

A study of the topography of that portion of the drainage basin of the Coyote River which lies below the present Coyote Reservoir indicates that there is a natural reservoir site at the point of which the Coyote River debauches from the hills. This location is commonly known as the Upper Gorge of the Coyote River.

This location is very advantageous in that it is below the confluence of all of the major tributaries of the Coyote River. A dam at this point would impound the runoff from Clark (or Otis) Canyon, Packwood Creek, Las Animas Creek and the overflow from the present Coyote Reservoir.

The topography at this location provides an excellent damsite for a reservoir with a storage capacity up to 75,000 acre-feet. The dam would be located at the mouth of the gorge about one-half mile below the junction of the Las Animas Creek with the Coyote River.

Preliminary estimates have been made of the annual water crop that could be obtained and also of the quantities and cost of the various items entering into the construction of this dam. Details of this preliminary study are given below.

Hydrology

The drainage area above the proposed Coyote Dam No. 2 is 193 square miles. Of this area, 119.5 square miles lie above the present Coyote Dam and 73.5 square miles between the existing and proposed Coyote dams. Therefore, Coyote Reservoir No. 2 will furnish sole control for about 38 percent of the entire watershed and will furnish auxiliary control for the remaining 62 percent of the watershed.

Records of the runoff of the Coyote River at the Upper Gorge are available for a 46 year period. These records show a wide variation in the flow passing this point, ranging from a maximum of 204,000 acre-feet in the 1906-07 season to a minimum of 878 acre-feet in the 1923-24 season, the average being 58,360 acre-feet per year. Table I gives the total runoff of the Coyote Gorge for each season since the 1902-03 season.

TABLE I

RUNOFF OF COYOTE RIVER AT UPPER GORGE IN ACRE-FEET PER YEAR

Season	Runoff	Season	Runoff	Season	Runoff
1902-03	83,200	1918-19	46,400	1934-35	32,020
03-04	35,800	19-20	14,000	35-36	54,310
04-05	31,800	1920-21	56,800	36-37	62,850
05-06	117,000	21-22	69,100	37-38	151,400
06-07	204,000	22-23	50,700	38-39	20,320
07-08	47,200	23-24	878	39-40	65,420
08-09	176,000	24-25	13,200	1940-41	138,100
09-10	45,300	25-26	40,300	41-42	76,120
1910-11	126,000	26-27	53,330	42-43	69,070
11-12	6,380	27-28	22,500	43-44	51,100
12-13	3,845	28-29	7,250	44-45	51,670
13-14	189,014	29-30	20,100	45-46	37,810
14-15	138,000	1930-31	1,670	46-47	8,950
15-16	92,000	31-32	69,800	47-48	4,790
16-17	67,900	32-33	8,110		
17-18	12,200	33-34	10,700	Average	58,360

Since the 1935-36 season the runoff of the Coyote River has been partially controlled by the existing Coyote Reservoir. The runoff shown in Table I for the period 1935 to date includes the storage releases from Coyote Reservoir. Table II gives the flow available for storage by a second reservoir below the present one. That is, the values in Table II are the total flow as measured at the Upper Gorge minus storage releases.

TABLE II

NET RUNOFF OF COYOTE RIVER AT UPPER GORGE EXCLUDING STORAGE RELEASES FROM COYOTE RESERVOIR

(See Note 1)

Season	Net Runoff in Acre-feet
1935-36	34,705
36-37	46,185
37-38	131,195
38-39	5,165
39-40	50,535
1940-41	123,215
41-42	61,340
42-43	51,585
43-44	28,255
44-45	31,460
45-46	11,915
46-47	7,005
47-48	3,885

Note 1: Net runoff is the flow measured at the Upper Gorge minus storage releases from Coyote Reservoir No. 1.

A detailed analysis of the figures in Table II has been made in order to determine the amount of storage required at this site. In making such an analysis it is not sufficient to confine the study to present requirements. For example, a relatively small reservoir would furnish sufficient storage capacity to provide a carryover for one or two dry years if the water were to be used only as a supplemental supply for percolation in the Coyote River. However, if possible future uses, such as transfer of part of this water to the West side of the Valley, are taken into account the problem becomes more complex.

By plotting a mass curve for the net runnoff (See Note 1) at the Upper Gorge, it is possible to determine the storage capacity required for various rates of use. Such a study has been made. In this study it has been assumed that use of water for percolation to the underground gravels could be made in the seven months, May to November inclusive, and no use would be possible in the remaining five winter months. This assumption would hold in all except very dry years, when use probably could be continuous over a twelve-month period.

If the rate of use during this seven-month period, mentioned above, were 50 cubic feet per second the annual use would be 21,100 acre-feet. Using this rate a study was made to ascertain the number of years during which this rate of use could have continued assuming a 60,000 acre-foot capacity reservoir had been constructed in time to start operating in January of 1937. This study showed that such a reservoir would have first filled in January of 1938. It would have provided sufficinet carryover to maintain this rate of use throughout the dry year of 1939. During the succeeding wet years, 1940-43, this rate of use could have continued with very little depletion in storage. The last time such a reservoir would have been full would have been in May 1945. From then on use at the specified rate could have continued up to the present time and in November of 1948 there would have been about 12,000 acre-feet still in storage.

Although the above rate of use would provide an additional supply of water amounting to 21,100 acre-feet per year it was deemed advisable to make a further study at a higher rate of use in order to take into account possible future uses of this water as mentioned previously. Therefore, a further study was made assuming a rate of use of 100 cubic feet per second during the seven-month period previously discussed. This rate would provide 42,200 acre-feet per year.

This study indicates that a 60,000 acre-foot reservoir placed in service in January 1937, would not have provided continuous use throughout the entire period since that time. Furthermore it would have finally emptied in October 1946 and remained empty till the end of 1948. However, if the capacity of this reservoir were 75,000 acre-feet, use could have been continuous at the specified rate until August 1947. Thus, a 75,000 acre-foot reservoir would have provided carryover for one additional dry year.

It has not been deemed practicable to consider a reservoir with a storage capacity greater than 75,000 acre-feet. Furthermore, it is not deemed advisable to consider a reservoir of less than 75,000 acre-feet capacity. This is especially true if the possibility of outside water being imported into this Valley is borne in mind. If such should occur in the future, this reservoir could be used to provide some temporary storage from such an outside source.

Damsite

As mentioned previously the proposed damsite for Coyote Reservoir No. 2 is at the mouth of the Upper Gorge of the Coyote River. Preliminary engineering surveys have been made of this site to determine quantities involved. Plate I gives Area and Capacity Curves for this proposed reservoir.

It will be noted from Plate II that for 60,000 acre-feet capacity the spillway lip would be at Elevation 609 and for 75,000 acre-feet capacity the spillway lip would be at Elevation 625. In the first case the crest elevation would be 624 giving a height above streambed of about 215 feet. For the larger reservoir the crest elevation would be 640 giving a height above streambed of about 230 feet.

Surveys of the site show that there is an excellent location for a detached spillway on the right abutment. This simplifies construction and eliminates the necessity for the high steep cuts that are necessary if the spillway must be located on the side-hill adjacent to the dam.

On April 6, 1949 Messrs. Chester and Bert Marliave, consulting geologist, visited this site and made an inspection of the entire damsite and the surrounding area. Upon completion of their inspection, they reported that the site was admirably adaptable to the construction of a rolled-earth fill or an earth and rock fill type dam of the size proposed. They further reported that an abundant supply of suitable material is available at or near the proposed site.

In view of these facts, it is hereby recommended that a conventional rolled-earth fill, or earth and rock fill, dam be constructed at the Upper Gorge of the Coyote River to create a reservoir of 75,000 acre-feet capacity.

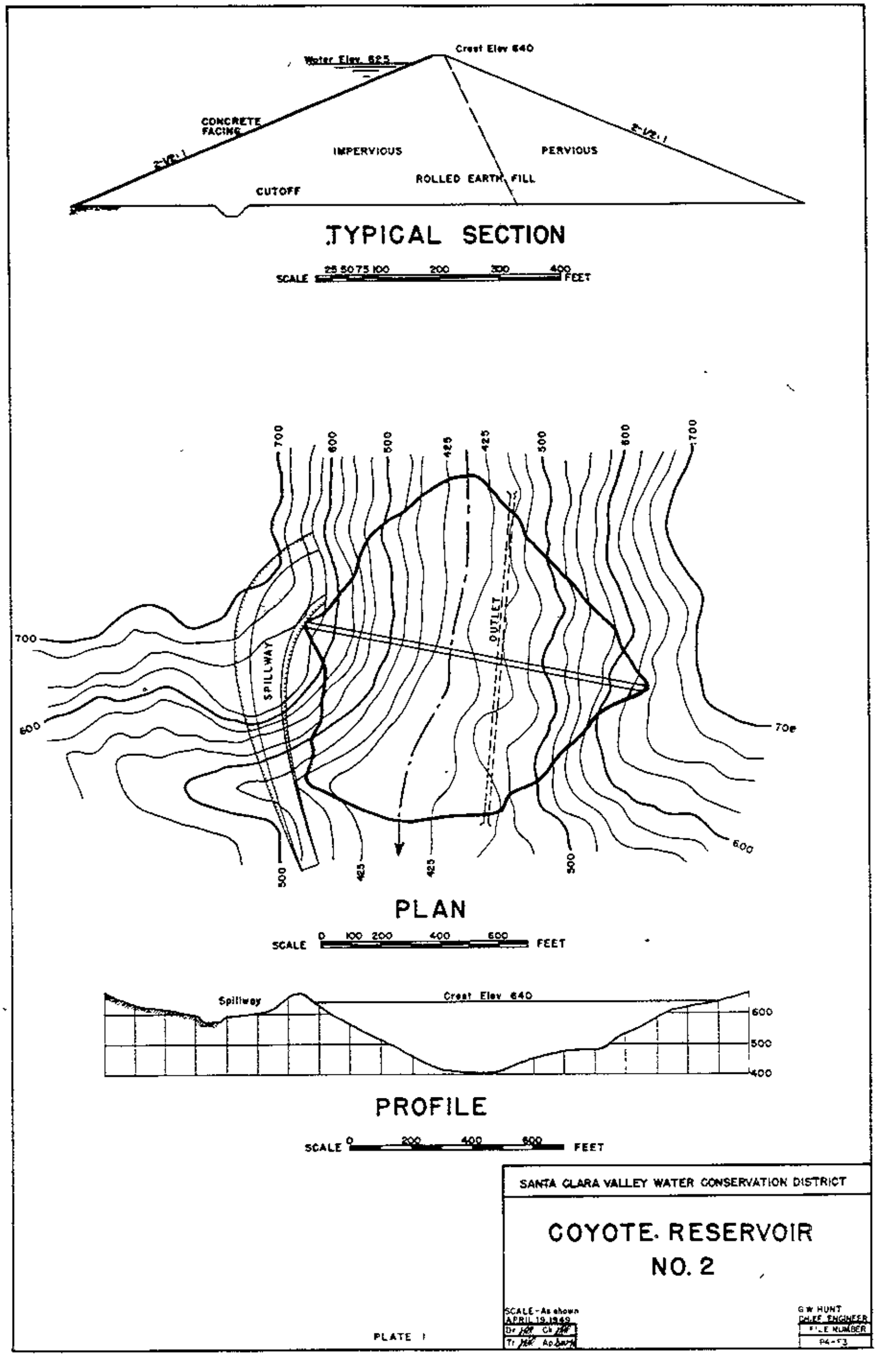
Plate I shows the preliminary plan, profile and a typical section of the proposed Coyote Reservoir No. 2.

Plate II shows the proposed Coyote Reservoir No. 2.

An estimate of the cost of the proposed Coyote Dam No. 2 has been made. This estimate is based upon current unit prices for this type of construction. Although unit prices on earth dam construction are slightly higher now than they were a year ago it is believed that they will level off or probably drop slightly in the near future.

The estimated cost of constructing the dam, building the necessary roads and purchasing the necessary land and rights of way for the dam and reservoir, and for the acquisition and construction of other works, property or structures necessary or convenient for the conservation of water by the Santa Clara Valley Water Conservation District is approximately $3,000,000.00

Respectfully submitted by,
G. W. HUNT, Chief Engineer.


Water Elev. 625
Crest Elev 640
CONCRETE FACING
2-1/2:1
IMPERVIOUS
PERVIOUS
2-1/2:1
ROLLED EARTH FILL
CUTOFF
TYPICAL SECTION
SCALE 25 50 75 100 200 300 400 FEET
700
600
500
425
425
500
600
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700
600
SPILLWAY
OUTLET
70e
600
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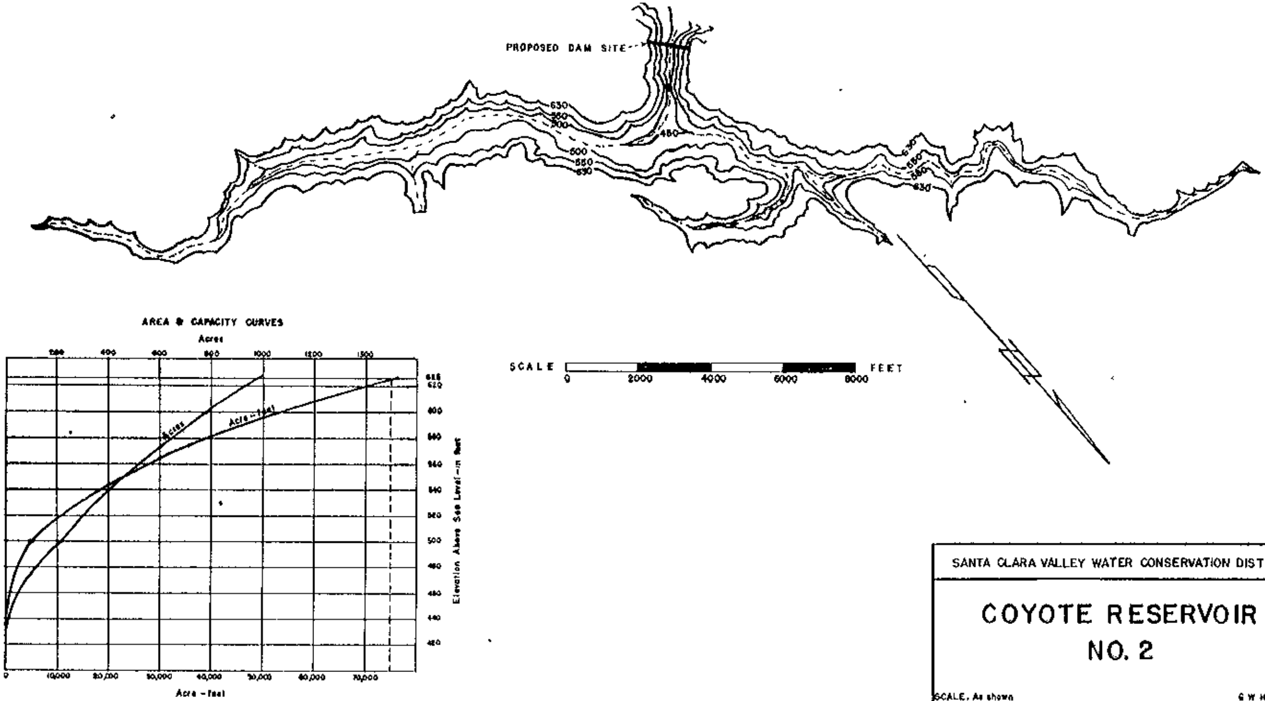
PLAN
SCALE 0 100 200 400 600 FEET
Spillway
Crest Elev 640
600
500
400
PROFILE
SCALE 0 200 400 600 FEET
SANTA CLARA VALLEY WATER CONSERVATION DISTRICT
COYOTE RESERVOIR
NO. 2
SCALE - As shown
APRIL 19, 1949
Dr Ch
Tr Ap
G W HUNT
CHIEF ENGINEER
FILE NUMBER
P4-53
PLATE I

PLATE I



SANTA CLARA VALLEY WATER CONSERVATION DISTRICT

COYOTE RESERVOIR
NO. 2

SCALE, As shown
APRIL 19, 1949

Dr.	Ck.
Tr.	Ap.

G W HUNT
CHIEF ENGINEER

FILE NUMBER
P4-F3

PLATE 2

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